

U.S. Environmental Protection Agency
Science Advisory Board
Radiation Advisory Committee (RAC)
Augmented for Uranium In-Situ Leach/Recovery (ISL/ISR) Advisory
Summary Minutes of Public Conference Call Meeting¹
July 12, 2011

Committee: U.S. Environmental Protection Agency's (EPA's) Science Advisory Board (SAB) Radiation Advisory Committee (RAC) augmented for advisory review of EPA's draft report "*Considerations Related to Post-Closure Monitoring of Uranium In-Situ Leach/In-Situ Recovery (ISL/ISR) Sites,*" June 2011. (See Roster. Please note that the superscript numbers here and elsewhere in the text refer to the Materials Cited on the last page of these minutes)¹.

Date and Time: Tuesday, July 12, 2011 from 1:00 p.m. to 4:00 p.m. Eastern Daylight Time (See Federal Register Notice)².

Location: This is a conference call with no location announced. All participants were connected via the conference lines.

Purpose: The purpose of this public conference call meeting is for the Augmented Radiation Advisory Committee (RAC. See Roster)¹ to discuss and seek clarification of EPA's charge for the face-to-face meeting of July 18 and 19, 2011, as well as to discuss committee assignments. The request for the advisory and the charge questions is contained in the June 2, 2011 memorandum request³ from Michael P. Flynn, Director, EPA's Office of Radiation and Indoor Air (ORIA) to Dr. Vanessa Vu, Director of the Science Advisory Board (SAB) Staff Office. As the discussion summary below indicates, the RAC focused on organizing the participants into groups as lead discussants to deal with each of the four charge questions from the client office, ORIA, as well as identifying those areas that ought to be highlighted by the ORIA staff in their presentations and discussions to take place on July 18 & 19, 2011 in the Washington, DC area.

Participating RAC Augmented Members: Dr. Bernd Kahn, RAC Chair, Dr. Susan M. Bailey, Dr. Thomas Borch, Dr. Douglas B. Chambers, Dr. Shih-Yew Chen, Dr. Faith G. Davis, Dr. June T. Fabryka-Martin, Dr. R. William Field, Dr. Thomas E. Johnson, Dr. Jonathan M. Links, Dr. Brian A. Powell, Dr. Dale L. Preston, Dr. Daniel O. Stram. Not Present (due to travel or scheduling conflicts): Dr. Thomas B. Borak, Mr. Bruce A. Napier, and Dr. William F. Morgan.

SAB Staff Office: Dr. K. Jack Kooyoomjian, Designated Federal Officer (DFO) for the RAC Augmented for this activity participated.

¹ NOTE: The minutes provide highlights and summaries of individual commentaries, observations, discussions with Agency staff and other participants, as well as highlights and summaries of public commentary. For the most definitive advice from the subject matter experts, please refer to the final, approved advisory transmitted to the Administrator, as well as to public comments..

EPA Staff Attendees: Members of the EPA Office of Radiation and Indoor Air (ORIA) Washington, DC Staff Office included Dr. Mary E. Clark, Mr. Jonathan D. Edwards, and Mr. Thomas Peake. Also participating was Ms. Angeliqe Diaz, EPA Region 8 (Denver, CO).

Other Public Attendees: The members of the public who identified themselves as being on the line included the following: Ms. Amanda Aspatore, Attorney, Powertech (USA), Inc., Mr. Richard Blubaigh, Vice President of Environmental Health & Safety Resources of Powertech (USA), Inc.; Mr. Jim Cain, Radiation Safety Officer of Cotter Corp.; Mr. John Cash, Vice President Regulatory Affairs, Exploration & Geology, Ur-Energy (USA), Inc, Casper, WY; Mr. Scott Charmin, Uranium 1; Mr. Ty Embrey, Attorney, Texas Mining & Reclamation Association, Austin, TX; Mr. Geoffrey H. Fettus, Senior Project Attorney for Nuclear Program for the Natural Resources Defense Council (NRDC); Mr. Francis Laval (Val) Green, Project Manager, Southeast Rural Community Assistance Project (RCAP), Inc., Roanoke, VA; Mr. Douglas P. Guarino, Associate Editor, Inside EPA; Mr. Thomas Lancaster, Uranium Recovery Licensing Branch, US NRC, Rockville, MD; Mr. Joshua (Josh) Leftwich, Director of Radiation Safety, Health, Environmental Quality & Licensing, Cameco Resources, Cheyenne, WY; Mr. Douglas Mandeville, Uranium Recovery Licensing Branch of the US Nuclear Regulatory Commission (NRC), Rockville, MD; Mr. Oscar Paulson, Kennecott Uranium representing the National Mining Association (NMA); Mr. John L. Saxton, Hydrogeologist, Uranium Recovery Licensing Branch, US NRC, Rockville, MD; Mr. John P. Schmuck, Senior Permitting Manager, Cameco Resources, Cheyenne, WY; Dr. Elise A. Striz, Hydrogeologist, Uranium Recovery Licensing Branch, US NRC, Rockville, MD; Ms. Katie Sweeney, NMA; Mr. Michael (Mike) Thomas, Environmental, Safety and Health Manager, Uranerz Energy Corp., Casper, WY; Mr. Anthony (Tony)Thompson, Attorney, Chin Pugsley and outside Counsel representing the NMA; Mr. Jon Winter, Uranium 1 (USA), Casper, WY; and Mr. Toby Wright, Titan Uranium (USA), Riverton, WY.

Meeting Summary: The meeting followed the issues and general timing as presented in the meeting agenda⁴, except as noted in these minutes with modest time adjustments. Written public comments were received in advance of the public meeting, were provided to the augmented RAC, and were posted onto the SAB Website (<http://www.epa.gov/sab>).⁷ Verbal comments were also provided by the public at the meeting (see text below for a summary of the written comments, as well as a summary of the verbal discussion).

Welcome and Introductions: Dr. K. Jack Kooyoomjian opened the meeting at 1:00 pm with identification of the participants logging into the call and with opening remarks, and introduced himself as the Designated Federal Officer (DFO) for the Radiation Advisory Committee (RAC) augmented for the advisory review of EPA's draft technical document entitled "*Considerations Related to Post-Closure Monitoring of Uranium In-Situ Leach/In-Situ Recovery (ISL/ISR) Sites.*" June 2011. He explained the purpose of this conference call is to discuss and seek clarification of EPA's charge to the RAC, to discuss the draft agenda for the upcoming face-to-face meeting of July 18 and 19, 2011⁵, to discuss and make committee assignments, to request focused presentations by the Agency's ORIA staff at the July 18 & 19, 2012 face-to-face meeting on

specific issues of interest, as well as to receive public commentary.

Dr. Kooyoomjian advised the participants that the SAB operates under the requirements of the Federal Advisory Committee Act (FACA) and conducts business under the auspices of the chartered SAB. Consistent with FACA and with EPA policy, the deliberations of the augmented RAC are conducted in public meetings, for which advance notice is given, and where he is present as DFO to ensure that the requirements of FACA are met, including the requirements for open meetings, for maintaining records of deliberations of the augmented RAC, and making available the public summaries of meetings, as well as providing opportunities for public comment.

Dr. Kooyoomjian also noted that the members of the augmented RAC were in compliance with Federal ethics and conflict-of-interest laws that apply to them. Dr. Kooyoomjian further noted that Ethics Training was completed by the RAC and all augmented participants and is on file at the SAB, that there is no need for disclosure at this time, other than the individual participants to briefly introduce themselves and their relation to the topic. He advised that there is no particular matter that may pose a potential conflict of interest, that each participant will disclose relations and experiences to the issues pertaining to the advisory discussions to take place over the forthcoming two days on July 18 and 19, 2011, and that the biosketches of each participant are posted on the SAB website.

Dr. Bernd Kahn, Chair of the augmented RAC, provided some brief introductory remarks at 1:24 p.m. He cited the charge memo from Michael Flynn³, the written public comments received in advance of this conference call, as well as the background materials provided in advance of the meetings⁶. At 1:28 pm, he then invited the three public commenters to offer their commentary ahead of the Agency participants.

Public Comments:

Written public comments were received in advance from Mr. Donovan Porterfield in response to the June 23, 2011 Federal Register notice announcing the public meetings.⁷ The written public comments were posted onto the SAB Website (<http://www.epa.gov/sab>), and provided to the augmented RAC participants by the DFO, Dr. Kooyoomjian. Mr. Porterfield was not present, but had provided a recommended analyte list for consideration by the SAB's RAC, and his written comments are briefly paraphrased as follows, noting that "... he believes that other radionuclide monitoring analyte lists are too minimal to properly characterize possible changes to the groundwater system." He also suggested that "...consideration for the ISL/ISR process might be given by the Committee to information provided by voluntary consensus standard organizations, such as the ASTM international, and that such a relationship between federal agencies and voluntary consensus standard organizations is contained in the National Technology Transfer and Advancement Act and OMB Circular A-119, 'Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities.' "

The rest of the commenters for the public teleconference provided verbal comments,

which are briefly summarized below:

At 1:28 pm, the first commenter was Mr. Oscar Paulson of Kennecott Uranium, representing the National Mining Association (NMA), and he reminded the participants that uranium in-situ recovery occurs as an exempted activity. For those portions of aquifers involved with underground injection activities, the typical radionuclides such as Ra²²⁶, and uranium, as well as the waters in portions of the aquifer being unsuitable for consumption are in the exempted activity portion of the aquifer where there are also requirements upon the licensee for points of compliance. He discussed pre and post mining conditions, the use of monitoring wells to establish background conditions, and related issues involved in pre- and post-monitoring sites to assure licensing, safety and compliance related to ISL/ISR mining activities.

At 1:32 pm, Ms. Katie Sweeney, General Counsel for the NMA provided commentary, noting that among the NMA members are companies that use the uranium in-situ mining procedure. She recommended that establishment of regulatory procedures, requirements and controls for the uranium in-situ ISL/ISR mining and extraction activities should be commensurate with the risks. She volunteered that data could be provided from the NMA participants, if the Committee felt that would be helpful. She offered that the NMA members have experience, data, studies and additional information that might be helpful to the US EPA/SAB/RAC augmented for this activity as it reviews this topic.

At 1:35 pm, Mr. Geoffrey Fettus, Senior Attorney with the Natural Resources Defense Council (NRDC) wished to convey to the RAC that they also would like to be a resource and provide assistance to the Committee. He asked about the timeline and schedule for this activity so as to be timely in providing advice in the process. He further advised that it was the understanding of the NRDC that portions of the aquifer in areas where mining activity has occurred have been disparate, and that some permits have been issued in areas containing good quality, usable (i.e., potable, or otherwise usable for other purposes) water which, simply because of the mining activity (it is legislatively exempted), cannot now be used. He observed that it is his understanding that neither the U.S. Nuclear Regulatory Commission (NRC) nor the U.S. Environmental Protection Agency (EPA) have sufficiently detailed and precise activities relating to information and data at some of these ISL/ISR sites.

There being no additional public participants requesting commentary, the public comments ended at 1:40 PM.

Overview of Uranium In-Situ Advisory:

At 1:40 p.m., Dr. Kahn invited Dr. Mary Clark, Assistant Director for Science from the ORIA Staff Office, to provide an overview and to offer brief introductory remarks of EPA's request to the SAB's RAC for an advisory on Uranium In-Situ ISL/ISR mining. She explained that need for the Agency to consider revisions to 40 CFR Part 192 pertaining to health and environmental protection standards for uranium and thorium mill tailings in accordance with the Uranium Mill Tailings Radiation Control Act (UMTRCA) section 206. The Agency's expectation is that the RAC augmented for this activity will provide helpful and focused advice

on the draft materials provided by the Agency, and that the Agency looks forward to consider this advice in the process of revising 40 CFR Part 192, particularly relating to uranium in-situ leach recovery operations.

At 1:41 pm, Dr. Clark, introduced Mr. Jonathan (Jon) Edwards the Director of the Radiation Protection Division (RPD) within the Office of Radiation and Indoor Air (ORIA). Mr. Edwards noted that the draft technical background document, dated June 2011⁸ is on the SAB Website, and that the science and technical questions are a part of the effort to revise the rulemaking. He thanked the SAB's RAC for its' past advice, especially for the recent advice pertaining to the radiogenic cancer risk assessment methodology and the review of the Agency's draft Blue Book. He noted that the regulatory aspects of uranium in-situ leach/recovery (ISL/ISR) technology have not been explicitly addressed, and need to be considered in the revisions to be forthcoming in 40 CFR Part 192. He recognized that the regulations and requirements addressing public health and environmental concerns within 40 CR Part 192 have not been touched in quite a while (since 1995), and that the Agency appreciates the SAB assembling the RAC specifically augmented for this advisory. He remarked that the Agency is very much looking forward to the opportunity to receive feedback from the augmented RAC in the face-to-face meeting and follow-up activities. He also emphasized that the Agency is particularly interested in advice pertaining to post-closure monitoring.

Mr. Jon Edwards and Dr. Mary Clark introduced the charge questions in Michael Flynn's June 2, 2011 memo.³ They noted that there are several objectives for monitoring an ISL/ISR uranium extraction operation, and specifically:

- 1) To establish pre-mining groundwater chemical compositions;
- 2) To have the ability to detect excursions of the injected and mobilized components beyond the well field, and
- 3) To determine when the post-mining/restoration phase groundwater chemistry has "stabilized."

The Agency is seeking advice from the augmented RAC on those technical considerations relevant specifically to establishing monitoring plans to achieve the objectives stated above, and to receive detailed and helpful advice pertaining to the four charge questions in the request memo from ORIA Director, Michael Flynn.³

Dr. Kahn briefly outlined the areas addressed in the June 2011 draft technical document, and highlighted the need to ask questions clarifying understanding of the four charge questions directed to the RAC pertaining to what EPA is asking of them for this advisory. He suggested that the augmented RAC participants may wish to think about those points they might want emphasized in the staff presentations at the face-to-face meeting on July 18 & 19, 2011.

The following four charge questions were briefly identified:

1. *The technical areas described in the report and their relative importance for designing and implementing a monitoring network. Identify any technical considerations that have been omitted or mischaracterized;*
2. *The proposed approaches for characterizing baseline groundwater chemical*

- conditions in the pre-mining phase and proposed approaches for determining the duration of such monitoring to establish baseline conditions;*
3. *The approaches considered for monitoring in the post-mining/restoration phase and the approaches considered for determining when groundwater chemistry has reached a “stable” level; and*
 4. *Suitable statistical techniques that would be applicable for use with ISL/ISR mining applications (particularly for the areas in items 2 and 3 above), as well as the subsequent data requirements for their use.*

Dr. S.Y. Chen asked if the Agency is establishing standards or procedures for monitoring. Mr. Thomas Peake of ORIA’s Radiation Protection Division (RPD) answered that the Agency desires to establish performance standards.

Dr. Douglas Chambers had questions for the Agency, asking if they could elaborate on the basis for an exemption, and the rule for points of compliance. Dr. Jonathan Links followed up on that and was seeking further clarification pertaining to exempted versus non-exempted groundwater, and whether or not exempted groundwaters need to be restored to their baseline pre-mining conditions.

Mr. Jon Edwards offered a cautionary note that this is dealing with regulatory policy, and we need to tread carefully and keep a focus on the science and technical questions and not the policy and regulatory direction.

Dr. S.Y. Chen thought that the questions being asked by Dr. Chambers, Dr. Links and others actually relate to the technical part, and that the RAC needs context to the points-of-compliance, such as with drinking water standards. Dr. Links also felt that they (the RAC participants) were not commenting on policy, but need context, for instance Maximum Detection Levels (MDLs) and/or Maximum Concentration Levels (MCLs) relating to a given aquifer. They (the RAC participants) cited the need for scientific and technical comments in this context.

Dr. S.Y. Chen further thought that there is a need to understand those groundwater “lessons learned” from the NRC as an activity that would be very helpful. He observed that for ISL/ISR, there is a need to address such items as groundwater chemistry, including alkaline, acid-based and ammonia-based technologies. This assessment was shared by other RAC participants.

Dr. Bernd Kahn observed that the Agency did not include the tables of required MCLs. He also acknowledged that there needs to be an expanded discussion of the charge questions, and it was his assessment that the augmented RAC will need to form sub-groups to address the specific charge questions in sufficient detail to be helpful to the Agency as it considers its options for revisions to 40 CFR Part 192. With respect to the Charge Questions, he noted the following:

CQ #1 will deal with designing and implementing a monitoring network and with the fundamentals of what is going to happen there;

CQ #2 deals with pre-operational monitoring and the criteria concerning the

hydrogeology and water quality of the area. It also deals with such fundamental questions as where to put wells, how best to establish baseline conditions, how deep they should be, what analytes to look for and related issues;

CQ #3 deals with post-operational monitoring and restoration; and

CQ #4 deals with statistics and uncertainty. It cannot be expected to lump pre- and post-operational numbers together. He thought that we need a discussion and commentary on modeling in this context to see how modeling might add to the knowledge of what to compare with what.

After a brief discussion, Dr. Kahn suggested the following grouping of the augmented RAC participants. He noted that Dr. Susan Bailey had gotten off the line when committee assignments were being discussed, so for the present, she may be the “Ad Hoc Floater” RAC person to chime in as she sees fit among the four Charge Questions. He also reminded everyone that they are welcome to comment on all the charge questions, but that the following grouping should be considered as the “Lead Discussants” to be the final arbiters for the recommended consensus responses by the augmented RAC to the Charge Questions. He suggested the following groupings:

CQ #1 Design: S.Y. Chen, Thomas Johnson, and Jonathan Links;

CQ #2 Pre-Operational Monitoring (includes models, what is found in other places): Thomas Borch, Bruce Napier, and June Fabryka-Martin;

CQ #3 Post-Operational Monitoring (i.e., monitoring during and at the end of mining): Douglas Chambers, Bill Field, and Brian Powell;

CQ #4 Statistics & Uncertainty: Faith (Faye) Davis, Dale Preston, and Dan Stram.

Dr. S.Y. Chen asked what the product of next week’s meeting will be. Dr. Kahn observed that he anticipates we will have all our assignments for each RAC participant, we will have dialogue and receive clarification from EPA at the July 18 & 19, 2011 meeting, we will receive further public comments, and we will prepare the outline and the beginnings of a first working draft after some weeks. He anticipates that we will have a teleconference or two following the face-to-face meeting to get our draft advisory in shape and to reach consensus. The consensus draft will then be sent to the SAB’s Charter Board for a quality review before being transmitted to the EPA Administrator.

Mr. Tom Peake of ORIA clarified that the point(s) of compliance is within the well field, and that the Agency will provide more context next week.

There being no further business to discuss, Dr. Kahn thanked all the participants and moved to adjourn the meeting at 2:26 pm.

MATERIALS CITED

The following materials can be accessed through the SAB Website at (www.epa.gov/sab) at the following hotlink:

<http://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCal/A9C7AD05D66D7C93852578AF006C9EF1?OpenDocument>

¹ Roster of Radiation Advisory Committee (RAC) Augmented for Uranium In-Situ ISL/ISR Advisory;

² Federal Register Notice Announcing the Meeting (FR Vol 76, No. 121,P.36918, Thursday, June 23, 2011);

³ Request for “Advisory Review of the Draft Technical Report: *Considerations Related to Post-Closure Monitoring of Uranium In-Situ Leach/In-Situ Recovery (IS/ISR) Sites;*” June 2, 2011 memo from Michael P. Flynn, Director Office of Radiation and Indoor Air to Vanessa Vu, Director, Science Advisory Board;

⁴ Meeting Agenda, Radiation Advisory Committee, Tuesday, July 12, 2011;

⁵ Review Draft of July 18-19, 2011 Meeting Agenda for Discussion on July 12, 2011

⁶ Hotlink to Agency Draft Document for Review and Selected Background Information Material and Hotlinks

⁷ Written Public Comments from Mr. Donovan Porterfield dated July 3, 2012

⁸ Draft Technical Report: “*Considerations Related to Post-Closure Monitoring of Uranium In-Situ Leach/In-Situ Recovery (ISL/ISR) Sites,*” Radiation Protection Division, Office of Air and Radiation ,U.S. Environmental Protection Agency, June 2011